AMENDMENT TO THE CLAIMS:

Please amend claims 15, 17 to 23 and 25 to 30, and please cancel claims 16, 24, 31 and 32, and please add new claims 33 to 44 as follows:

1-14. (Canceled)

15. (Currently amended) A substance adsorption detection method using the ~~a~~ sensor having a crystal oscillator, the method comprising:

providing a sensor with ~~having~~ an optical waveguide path disposed on the crystal oscillator, said crystal oscillator comprising a crystal and electrodes formed on either face ~~side~~ of said crystal, wherein said optical waveguide path is an optical waveguide layer which has a clad portion and a core arranged on said clad portion, said core being made of a higher refractive index medium than said clad portion, both said core and said clad portion being stacked on said crystal oscillator;

providing light inputting means and light emitting means positioned on end ~~one~~ faces of said optical waveguide path on which a detection target substance is adsorbed, wherein said light inputting means for allowing light to enter said core is provided on one end face thereof and said light emitting means for acquiring light from said core is provided on the other end face thereof;

exposing said sensor to said detection target substance, while inputting light through said light inputting means to said core of the optical waveguide path; and

measuring an oscillation characteristic of said crystal oscillator and ~~of~~ light transmitted on said optical waveguide path through said core while the light is repeatedly reflected in said core, said light being ~~and~~ emitted through said light emitting means.

16. (Canceled) ~~The substance adsorption detection method according to claim 15, wherein said waveguide path is an optical waveguide layer which has a clad portion and a core, said core being made of a higher refractive index medium than said clad portion, both said core and said clad portion being stacked on said crystal oscillator.~~

17. (Currently amended) The substance adsorption detection method comprising: ~~according to claim 15, wherein~~

providing a sensor with a crystal oscillator, said crystal oscillator comprising a crystal and electrodes formed on either face of said crystal, wherein at least one of said electrodes is ~~an optical waveguide electrode~~ made of an electrically conductive transparent material having a higher refractive index than that of the crystal, and wherein said crystal oscillator serves as an optical waveguide path made of a clad portion of said crystal and a core of said transparent conductive material electrodes, or made of a stacked core of said crystal and said transparent conductive material electrodes;

providing light inputting means and light emitting means positioned on end faces of said optical waveguide path on which a detection target substance is adsorbed, wherein said light inputting means for allowing light to enter said core is provided on one end face thereof and said light emitting means for acquiring light from said core is provided on the other end face thereof; ~~said optical waveguide electrode serving as a core of said optical waveguide path.~~

exposing said sensor to said detection target substance, while inputting light through said light inputting means to said core of the optical waveguide path; and

measuring an oscillation characteristic of said crystal oscillator and light transmitted on said optical waveguide path through said core while the light is repeatedly reflected in said core, said light being emitted through said light emitting means.

18. (Currently amended) The substance adsorption detection method comprising: ~~according to claim 15, wherein~~

providing a sensor with a crystal oscillator, said crystal oscillator comprising a crystal and electrodes formed on either face of said crystal, wherein at least one of said electrodes is a clad portion made of an electrically conductive transparent material having a lower refractive index than that of the crystal, and wherein said crystal oscillator serves as an optical waveguide path made of a core of said crystal;

providing light inputting means and light emitting means positioned on end faces of said optical waveguide path on which a detection target substance is adsorbed, wherein said light inputting means for allowing light to enter said core is provided on one end face thereof and said light emitting means for acquiring light from said core is provided on the other end face thereof; ~~wherein a crystal substrate of said crystal oscillator serves as a core of said optical waveguide path.~~

exposing said sensor to said detection target substance, while inputting light through said light inputting means to said core of the optical waveguide path; and

measuring an oscillation characteristic of said crystal oscillator and light transmitted on said optical waveguide path through said core while the light is repeatedly reflected in said core, said light being emitted through said light emitting means.

19. (Currently amended) The substance adsorption detection method according to any one of claims 15, 17 and 18, wherein a metallic film is formed on said optical waveguide path.

20. (Currently amended) A substance adsorption detection method comprising:

providing a sensor with a surface acoustic wave element, said surface acoustic wave element comprising a piezoelectric element on a substrate and comb-like opposing electrodes, wherein said piezoelectric element has a higher refractive index than that of said substrate, and wherein said surface acoustic wave element serves as an optical waveguide path made of a clad portion of said substrate and a core of said piezoelectric element;

providing light inputting means and light emitting means positioned on either side of said piezoelectric element, wherein said light inputting means for allowing light to enter said core is provided on one side thereof and said light emitting means for acquiring light from said core is provided on the other side thereof;

inputting light through said light inputting means to said core of the optical waveguide path while a detection target substance adsorbs on said piezoelectric element; and

measuring a propagation characteristic of said ~~a~~ surface acoustic wave by said comb-like opposing electrodes in said ~~a~~ surface acoustic wave element, and ~~of~~ light guided through said core of said ~~an~~ optical waveguide path provided in or on said surface acoustic wave element while the light is repeatedly reflected in said core, said light being emitted through said light emitting means.

21. (Currently amended) A substance adsorption detection method comprising:

providing a sensor forming a metallic colloid layer on at least one of a crystal oscillator and a surface acoustic wave element, said crystal oscillator comprising a crystal and electrodes formed on either face of said crystal;

inputting light downward to said metallic colloid layer while a detection target substance adsorbs on said metallic colloid layer;

measuring an adsorbed mass with at least one of said crystal oscillator and said surface acoustic wave element; and

measuring an optical characteristic of said metallic colloid layer.

22. (Currently amended) The substance adsorption detection method according to any one of claims 15, 17 and 18 ~~21~~, ~~wherein~~ further comprising a thin film on which a detection target substance is adsorbed, said thin film being a sensitive material layer whose optical characteristic is changed by substance adsorption ~~is provided~~.

23. (Currently amended) A sensor having a crystal oscillator, the sensor comprising:

said ~~a~~ crystal oscillator ~~further~~ comprising a crystal and electrodes formed on either face ~~side~~ of said crystal; and

an optical waveguide path disposed on the crystal oscillator, wherein said optical waveguide path is an optical waveguide layer which has a clad portion and a core arranged on said clad portion, said core being made of a higher refractive index medium than said clad portion, both said core and said clad portion being stacked on said crystal oscillator; ~~for guiding light~~

wherein light inputting means and light emitting means are provided on end faces of said optical waveguide path on which a detection target

substance is adsorbed, said light inputting means for allowing light to enter said core being provided on one end face thereof and said light emitting means for acquiring light from said core being provided on the other end face thereof, ~~one face of said sensor on which a detection target substance is adsorbed~~

wherein said sensor is exposed to said detection target substance, while inputting light through said light inputting means to said core of the optical waveguide path; and

wherein said sensor measures an oscillation characteristic of said crystal oscillator and light transmitted on said optical waveguide path through said core while the light is repeatedly reflected in said core, said light being emitted through said light emitting means.

24. (Canceled) ~~The sensor according to claim 23, wherein said waveguide path is constituted as an optical waveguide layer which has a clad portion and a core, said core being made of a higher refractive index medium than said clad portion, both said core and said clad portion being stacked on said crystal oscillator.~~

25. (Currently amended) The sensor comprising: ~~according to claim 23, wherein~~

a crystal oscillator comprising a crystal and electrodes formed on either face of said crystal, wherein at least one of said electrodes is ~~an optical waveguide electrode~~ made of an electrically conductive transparent material having a higher refractive index than ~~a refractive index~~ that of the crystal, and wherein said crystal oscillator serves as an optical waveguide path made of a clad portion of said crystal and a core of said transparent conductive material electrodes, or made of a stacked core of said crystal and said transparent conductive material electrodes;

wherein light inputting means and light emitting means are provided on end faces of said optical waveguide path on which a detection target substance is adsorbed, said light inputting means for allowing light to enter said core being provided on one end face thereof and said light emitting means for acquiring light from said core being provided on the other end face thereof; ~~said optical waveguide electrode serving as a core of said optical~~

~~waveguide path.~~

wherein said sensor is exposed to said detection target substance, while inputting light through said light inputting means to said core of the optical waveguide path; and

wherein said sensor measures an oscillation characteristic of said crystal oscillator and light transmitted on said optical waveguide path through said core while the light is repeatedly reflected in said core, said light being emitted through said light emitting means.

26. (Currently amended) The sensor comprising: ~~according to claim 23, wherein~~

a crystal oscillator comprising a crystal and electrodes formed on either face of said crystal, wherein at least one of said electrodes is a clad portion made of an electrically conductive transparent material having a lower refractive index than that of the crystal, and wherein said crystal oscillator serves as an optical waveguide path made of a core of said crystal;

wherein light inputting means and light emitting means are provided on end faces of said optical waveguide path on which a detection target substance is adsorbed, said light inputting means for allowing light to enter said core being provided on one end face thereof and said light emitting means for acquiring light from said core being provided on the other end face thereof; ~~a crystal substrate of said crystal oscillator serves as a core of said optical waveguide path.~~

wherein said sensor is exposed to said detection target substance, while inputting light through said light inputting means to said core of the optical waveguide path; and

wherein said sensor measures an oscillation characteristic of said crystal oscillator and light transmitted on said optical waveguide path through said core while the light is repeatedly reflected in said core, said light being emitted through said light emitting means.

27. (Currently amended) The sensor according to any one of claims 23, 25 and 26, wherein a metallic film is formed on said optical waveguide path.

28. (Currently amended) A sensor comprising:

a surface acoustic wave element comprising a piezoelectric element on a substrate and comb-like opposing electrodes, wherein said piezoelectric element has a higher refractive index than that of said substrate, and wherein said surface acoustic wave element serves as an optical waveguide path made of a clad portion of said substrate and a core of said piezoelectric element;

wherein light inputting means and light emitting means are provided on either side of said piezoelectric element, wherein said light inputting means for allowing light to enter said core is provided on one side thereof and said light emitting means for acquiring light from said core is provided on the other side thereof;

wherein light is input through said light inputting means to said core of the optical waveguide path while a detection target substance adsorbs on said piezoelectric element; and

wherein said sensor ~~which~~ measures a propagation characteristic of said ~~a~~ surface acoustic wave by said comb-like opposing electrodes in said ~~a~~ surface acoustic wave element, and light guided through said core of said ~~an~~ optical waveguide path provided in or on said surface acoustic wave element while the light is repeatedly reflected in said core, said light being emitted through said light emitting means.

29. (Currently amended) A sensor comprising:

a crystal oscillator comprising a crystal and electrodes formed on either face of said crystal or a surface acoustic wave element; and

a metallic colloid layer formed on said crystal oscillator or said surface acoustic wave element.

30. (Currently amended) The sensor according to any one of claims 23, 25 and 26 ~~29~~, ~~wherein~~ further comprising a thin film on which a detection target substance is adsorbed, said thin film being a sensitive material layer whose optical characteristic is changed by substance adsorption ~~is provided~~.

31. (Canceled) ~~The substance absorption detection method~~

~~according to claim 15, wherein a thin film is provided on one side of said sensor so that a refractive index of said thin film is changed when said thin film adsorbs said detection target substance to thereby cause light from said light emitting means to change.~~

32. (Canceled) ~~The sensor according to claim 23, wherein a thin film is provided on one side of said sensor so that a refractive index of said thin film is changed when said thin film adsorbs said detection target substance to thereby cause light from said light emitting means to change.~~

33. (New) The substance absorption detection method according to claim 20, wherein a thin film on which a detection target substance is adsorbed is provided on said piezoelectric element, and said thin film is a sensitive material layer whose optical characteristic is changed by substance adsorption.

34. (New) The sensor according to claim 28, wherein a thin film on which a detection target substance is adsorbed is provided on said piezoelectric element, and said thin film is a sensitive material layer whose optical characteristic is changed by substance adsorption.

35. (New) The substance adsorption detection method comprising:

providing a sensor with a crystal oscillator, said crystal oscillator comprising a crystal and electrodes formed on either face of said crystal, wherein at least one of said electrodes is made of a metallic thin film, and wherein said crystal oscillator serves as an optical waveguide path made of a core of said crystal;

providing light inputting means and light emitting means positioned on end faces of said optical waveguide path on which a detection target substance is adsorbed, wherein said light inputting means for allowing light to enter said core is provided on one end face thereof and said light emitting means for acquiring light from said core is provided on the other end face thereof;

exposing said sensor to said detection target substance, while

inputting light through said light inputting means to said core of the optical waveguide path; and

measuring an oscillation characteristic of said crystal oscillator and light transmitted on said optical waveguide path through said core while the light is repeatedly reflected in said core, said light being emitted through said light emitting means.

36. (New) The sensor comprising:

a crystal oscillator comprising a crystal and electrodes formed on either face of said crystal, wherein at least one of said electrodes is made of a metallic thin film, and wherein said crystal oscillator serves as an optical waveguide path made of a core of said crystal;

wherein light inputting means and light emitting means are provided on end faces of said optical waveguide path on which a detection target substance is adsorbed, said light inputting means for allowing light to enter said core being provided on one end face thereof and said light emitting means for acquiring light from said core being provided on the other end face thereof;

wherein said sensor is exposed to said detection target substance, while inputting light through said light inputting means to said core of the optical waveguide path; and

wherein said sensor measures an oscillation characteristic of said crystal oscillator and light transmitted on said optical waveguide path through said core while the light is repeatedly reflected in said core, said light being emitted through said light emitting means.

37. (New) The substance absorption detection method according to claim 35, further comprising a thin film provided on said metallic electrode, said detection target substance being adsorbed on said thin film.

38. (New) The sensor according to claim 36, further comprising a thin film provided on said metallic electrode, said detection target substance being adsorbed on said thin film.

39. (New) The substance adsorption detection method according

to claim 15, wherein a metallic film is formed on said optical waveguide path and a thin film is further provided to adsorb a detection target substance thereon, said thin film being a sensitive material layer whose optical characteristic is changed by substance adsorption.

40. (New) The substance adsorption detection method according to claim 17, wherein a metallic film is formed on said optical waveguide path and a thin film is further provided to adsorb a detection target substance thereon, said thin film being a sensitive material layer whose optical characteristic is changed by substance adsorption.

41. (New) The substance adsorption detection method according to claim 18, wherein a metallic film is formed on said optical waveguide path and a thin film is further provided to adsorb a detection target substance thereon, said thin film being a sensitive material layer whose optical characteristic is changed by substance adsorption.

42. (New) The sensor according to claim 23, wherein a metallic film is formed on said optical waveguide path and a thin film on which a detection target substance is adsorbed is further provided, said thin film being a sensitive material layer whose optical characteristic is changed by substance adsorption.

43. (New) The sensor according to claim 25, wherein a metallic film is formed on said optical waveguide path and a thin film on which a detection target substance is adsorbed is further provided, said thin film being a sensitive material layer whose optical characteristic is changed by substance adsorption.

44. (New) The sensor according to claim 26, wherein a metallic film is formed on said optical waveguide path and a thin film on which a detection target substance is adsorbed is further provided, said thin film being a sensitive material layer whose optical characteristic is changed by substance adsorption.